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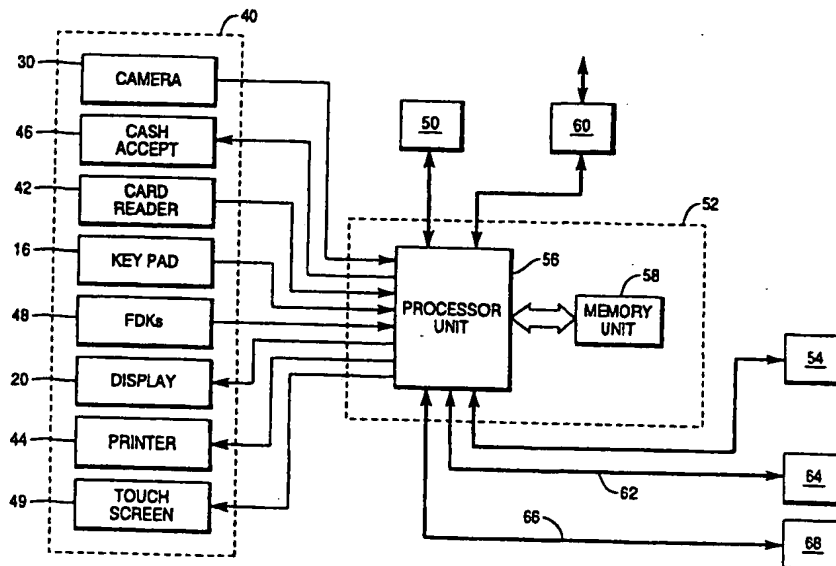
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(54) Title: SELF-SERVICE TERMINAL FOR CONTROLLING ACCESS TO A FACILITY



(57) Abstract

A self-service terminal (10) for controlling access to a facility (154) such as a sports stadium is described. The terminal (10) has means for identifying a user (30, 50, 52), which may be implemented using a biometrics unit for capturing an image of a user's iris. Terminal (10) also has means for receiving payment for the user (22, or 52 and 68); and means for actuating an access control device (60) to allow the user to enter the facility. The terminal (10) may include a cash deposit slot (18), a keypad (16), a ticket dispenser (22) and a display screen (20). The display screen, which can be touch sensitive, assists the user in ticket selection and can display seating arrangements. A method of controlling access to a facility using a self-service terminal, and a facility access system including a self-service terminal (10) and an access control device (152) are also described.

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SELF-SERVICE TERMINAL FOR CONTROLLING ACCESS TO A FACILITY

The invention relates to a self-service terminal (SST). In particular, the invention relates to an SST for controlling access to a facility.

Tickets are generally used to gain access to entertainment, leisure and transport facilities. These facilities may be buildings, stadia, theatres, or other types of venues. When a person requires a ticket for an event, such as a sports event, a theatre performance, or a cinema film, the person may buy the ticket at a remote location using, for example, a telephone or the Internet.

However, to gain entry to the facility the person holding the ticket must have the ticket validated, typically by passing the ticket to a teller for manual validation, or in some circumstances using a machine that provides automatic ticket validation.

One disadvantage with this arrangement is that the person who buys a ticket may not be the person who presents the ticket for gaining access to the facility. This is a particular problem where tickets are intended to be non-transferrable, for example, at a football stadium. A certain person may be prohibited from entering the football stadium, but may have a ticket purchased by a friend and may use the purchased ticket to gain entry for himself, thereby avoiding the prohibition.

Another disadvantage, which is associated with events for which there is a great demand for tickets, such as a football cup final, is that the person who originally

bought the ticket may resell the ticket for a much higher price than the face value of the ticket.

It is an object of the invention to obviate or mitigate one or more of the above disadvantages.

According to a first aspect of the invention there is provided a self-service terminal for controlling access to a facility, characterised in that the terminal comprises means for identifying a user; means for receiving payment for the user; and means for actuating an access control device to allow the user to enter the facility.

By virtue of this aspect of the invention, a single SST is used to identify a user, to receive payment from the identified user, and to provide entry for that identified user into the facility. This ensures that the person who buys the ticket is the person who gains entry to the facility. Also by virtue of this aspect of the invention, any counterfeit currency tendered by a user may be traced to that user because the user is identified prior to gaining entry to the facility.

Preferably, the means for identifying the user are biometrics identifying means. Biometrics is the measurement of some biological quantity (such as a trait or characteristic) pertaining to an individual that can be used to confirm or determine the individual's identity. The traits and/or characteristics may include measurements of fingerprints, palmprints, thumbprints, hand and/or finger geometry, facial geometry, iris patterns of one or both eyes, voice patterns, vein patterns, and such like.

In one embodiment, a user may provide payment and be granted access in a single visit to the SST.

In another embodiment, a user may provide payment at a first visit to the SST, and may be granted access to the facility at a second visit to the SST once the user has been identified.

The SST may have means for issuing a ticket in response to a request from the user. The ticket may serve as a receipt. The ticket may be some physical media. For example, the ticket may be paper-based, such as a slip; or plastics-based, such as a card.

Alternatively, the SST may credit an electronic ticket to the user's account so that when the user is identified the electronic ticket may be used to grant access to the facility. In such an embodiment there is no physical ticket issued, the electronic ticket is a token that is used to indicate that the user has paid for entry into the facility.

The access control device may be a turnstile that is electronically actuated by the SST. Alternatively, the access control device may be a secure door.

The SST may further comprise means for determining that the user has sufficient funds to purchase a ticket. Alternatively, or additionally, the SST may comprise currency receiving apparatus for receiving currency inserted by the user. The currency may be in the form of bank notes, coins, or electronic currency.

For facilities that have a choice of ticket types, the SST may further comprise display means for assisting the

user in ticket selection. For example, the display may indicate the area in the facility for which a ticket is valid.

According to a second aspect of the invention there is provided a method of controlling access to a facility using a self-service terminal, the method being characterised by the steps of: determining the identity of a user; receiving payment for the identified user; and actuating an access control device to allow the user to enter the facility.

Preferably, the step of determining the identity of a user uses biometrics detection. In some embodiments, the step of determining the identity of a user includes the step of reading card information to determine the claimed identity and verifying the claimed identity using biometrics detection.

Preferably, the method comprises the further step of displaying information for assisting the user in ticket selection.

The step of receiving payment for the identified user may comprise the further step of determining that the user has sufficient funds to purchase the ticket.

According to a third aspect of the invention there is provided a facility access system characterised by a self-service terminal and an access control device, where the terminal includes means for identifying a user, means for receiving payment from the user, and means for actuating the access control device to allow the user to enter the facility.

According to a fourth aspect of the invention there is provided a self-service terminal for controlling access to a facility, characterised in that the terminal comprises means for identifying a user; means for determining that a ticket has been assigned to the user; and means for actuating an access control device to allow the user to enter the facility.

By virtue of this aspect of the invention, a person may select and pay for a ticket at a location remote from the terminal, but may gain access to the facility once they are identified by the terminal. For example, a user may pay for a ticket by telephone or via the Internet using a credit or debit card. Once the ticket has been paid for, it is assigned to that person. When a terminal identifies that person the assigned ticket is disclosed as belonging to that person so that the terminal allows that person access to the facility. This has the advantage of decreasing the transaction time at the terminal. This also enables one person to buy tickets for other people; for example, a father may buy tickets for each of his two children.

The means for determining that a ticket has been assigned to the user may include a connection to a remote central ticket authorisation agency that records the tickets sold and the identity of the individual for whom each ticket has been purchased. In addition, the central ticket authorisation agency may record the identity of the individual who purchased each ticket. On identifying a user, the terminal accesses the central ticket authorisation agency to determine whether a ticket has been

purchased for that individual and consequently allows or denies access to the individual.

The invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows the fascia of a self-service terminal for controlling access to a facility;

Figure 2 shows a block diagram of the control system within the terminal;

Figure 3 shows a flow chart of the operational steps to carry out access control; and

Figure 4 shows a facility access system incorporating the terminal of Figure 1.

Referring to Fig 1, which shows part of one embodiment of the present invention, there is shown the fascia of a self-service terminal 10 for controlling access to a facility, such as a football stadium.

The fascia 12 includes a card reader slot 14 for receiving a credit or debit card, an encrypting key pad 16 for entering transaction details, a currency receiving slot 18 through which bank notes may be inserted by a user, a display screen 20 for providing information to the user and a receipt printer/ticket issuing slot 22 through which a receipt and/or ticket may be delivered to the user at the end of a transaction.

The display screen 20 is provided to display instructions and other information to assist in ticket selection. Additional keys (referred to as FDKs) 21, adjacent the display 20, are also provided to assist in ticket selection.

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The SST 10 has a camera 30 located behind a panel 32 near the top of the fascia 12. The camera 30 is used to implement biometrics sensing of the user.

Figure 2 shows a block diagram of the SST of Figure 1. Figure 2 shows a user interface module block 40 including the camera 30, a card reader module 42, the key pad 16, the display 20, a printer module 44, a cash accept module 46, an FDKs module 48, and a touch screen module 49. The card reader module 42, the printer module 44, and the cash accept module 46 are associated with the respective slots 14, 22 and 18 in the user panel 12 of the SST 10 (Figure 1).

Figure 2 also shows a biometrics sensing processor unit 50 that operates in association with the camera 30 to provide the biometrics sensing means.

The SST 10 further comprises processor means in the form of a controller unit 52 which communicates with components of the user interface module block 40, with an operator panel 54 mounted inside the SST 10, and with the biometrics sensing processor unit 50.

The operator panel 54 contains circuitry for enabling the operator to interact with the SST 10. Standard operator panels 54 are used on commercially available ATMs (Automated Teller Machines) and are well known in the art. Similarly, the cash accept module 46 will not be described herein as it is a feature of a conventional ATM.

The controller unit 52 includes a processor unit 56 and a non-volatile memory 58. The processor unit 56 and memory 58 may be implemented by a computer having non-

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volatile RAM; suitable computers and memories are readily available commercially.

The processor unit 56 is also connected to an access control device module 60 for actuating an access control device, which in this embodiment is a turnstile. In use, when a user has paid for a ticket, the processor unit 56 can actuate the access control module 60 to allow the user to enter the facility via the turnstile, as described below with reference to Figure 4.

The SST 10 also has a ticket availability connection 62 to a remote central ticket authorisation agency 64 for determining the availability of tickets, and a financial validation connection 66 to a remote financial institution 68 for validating account transactions.

Referring to Figures 1 and 2, in use, a user inserts a credit card or a debit card into the SST via slot 14 and follows prompts displayed on the screen 20 to purchase a ticket.

The prompts may commence with an instruction to look at the camera 30 (panel 32 may include a flashing light to attract the user's attention to the vicinity of the camera 30) to allow the camera 30 to capture an image of the user's iris. This image is then used to identify the user.

Suitable iris-based biometrics identification units (which include camera 30 and biometrics sensing processor unit 50 to operate on the captured iris image) are commercially available; for example, from "SENSAR" of 121 Whittendale Drive, Moorestown, New Jersey, USA 08057.

Once the user has been identified, the display 20 then displays ticket information such as pricing, availability, venue layout, and seat location. This information is provided from the remote central ticket authorisation agency 64 via the ticket availability connection 62.

The display has a touch sensitive screen so that a user can touch the preferred seat location to allow the system to identify the desired seat required. The additional keys 21 may be used, for example, to confirm purchase or to scroll the screen for additional venue displays.

The SST 10 typically connects to the remote financial institution 68 to validate the transaction. If paying by fund transfer from the user's account, the validation will ensure that sufficient funds are available. If paying by debit card or credit card then the validation will ensure that the cards are valid. If paying by cash, then the remote financial institution 68 will not be accessed for validating the transaction.

On purchase clearance the user will be allocated a ticket. This ticket may be electronic and credited to the user. Alternatively, this ticket may be a physical ticket printed within the SST 10 and delivered through an appropriate slot, such as slot 18.

The processor 56 is programmed to carry out a sequence of steps to allow the SST 10 to control access to the facility. A flow chart showing the steps executed is shown in Figure 3.

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The SST 10 continually monitors (step 102) whether a new user has arrived; this may be implemented by a pressure sensor located immediately in front of the SST 10, or the SST 10 may await a user inserting a card or touching a key on the fascia 12. When a user has been detected, the user is requested (step 104) to look at the camera 30.

Camera 30 then captures an image of the user's iris (step 106). This image is processed and used to identify (steps 108 and 110) the user; typically, this is achieved by comparing the image with stored images. The stored images may be located in a database within the SST 10 or in a database remote from the SST 10.

If the user cannot be identified (step 112) then the transaction is halted and the user is not allowed access to the facility.

If the user is identified (step 114), the user is presented with ticket information using screen 20. Once a ticket has been selected by the user (step 116), a ticket is assigned (step 118) to the user. A receipt and/or the ticket may be printed out by the SST 10. Alternatively, the SST 10 may actuate a control access device to allow the user to enter the facility immediately a ticket is assigned.

The cost of the ticket is applied to the user's card (step 120) and the card is returned to the user.

In Figure 4 the SST 10 is located immediately adjacent to an access control device 152 (in the form of a turnstile). The SST 10 and turnstile 152 are located in a gap within a perimeter wall 150 surrounding the facility

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154. A motor 156 is used to rotate the turnstile 152 under control of the access control device module 60 (Figure 2) to enable a user to enter the facility 154 via the gap in the perimeter wall 150.

The SST 10 permits a user to enter the facility when the transaction has been completed, that is, when the user has been identified and has purchased a ticket.

Various modifications may be made to the above described embodiments. For example, in other embodiments, the access control device may be a controlled door rather than a turnstile. Although the embodiment has been described in relation to assigning an electronic token, the term ticket is intended to include alternatives such as a physical slip or card which a user may present to the SST 10 at some later time to gain access to the facility. Although the SST is described as having only biometrics identification, in other embodiments, an SST could be used which uses a card based verification system. In other embodiments, the user could pay for the ticket using currency, such as bank notes and/or coins, or electronic currency. In other embodiments, the remote central ticket authorisation agency 64 and the remote financial institution 68 may be a single entity. In other embodiments, the SST 10 may be an ATM that has a link (such as a Web Browser link) to the remote central ticket authorisation agency 64. In other embodiments, the SST may not have a connection to the remote financial institution 68, it may only allow access to users who have already paid for their tickets. In some embodiments, the ticket may not have a monetary value (the value may be zero), for example,

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in admission to high security areas; however, in most embodiments, it is envisaged that the ticket will have some monetary value, that is, there will be a cost involved in buying the ticket.

CLAIMS

1. A self-service terminal (10) for controlling access to a facility (154), characterised in that the terminal (10) comprises means for identifying a user (30, 50, 52); means for receiving payment for the user (22, or 52 and 68); and means for actuating an access control device (60) to allow the user to enter the facility (154).

2. A terminal as claimed in claim 1, wherein the means for identifying the user are biometrics identifying means.

3. A terminal as claimed in claim 2, wherein the biometrics means includes means (30) for capturing an image of a portion of the user's face or eye and a controller (52) for processing the information to determine user identity.

4. A terminal as claimed in any preceding claim, wherein the terminal includes display means (20) for displaying seating arrangements within a designated venue for which tickets are required.

5. A method of controlling access to a facility using a self-service terminal, the method being characterised by the steps of: determining the identity of a user (step 108); receiving payment for the identified user (step 120); and actuating an access control device to allow the user to enter the facility (154).

6. A method according to claim 5, wherein the step of determining the identity of a user uses biometrics detection.

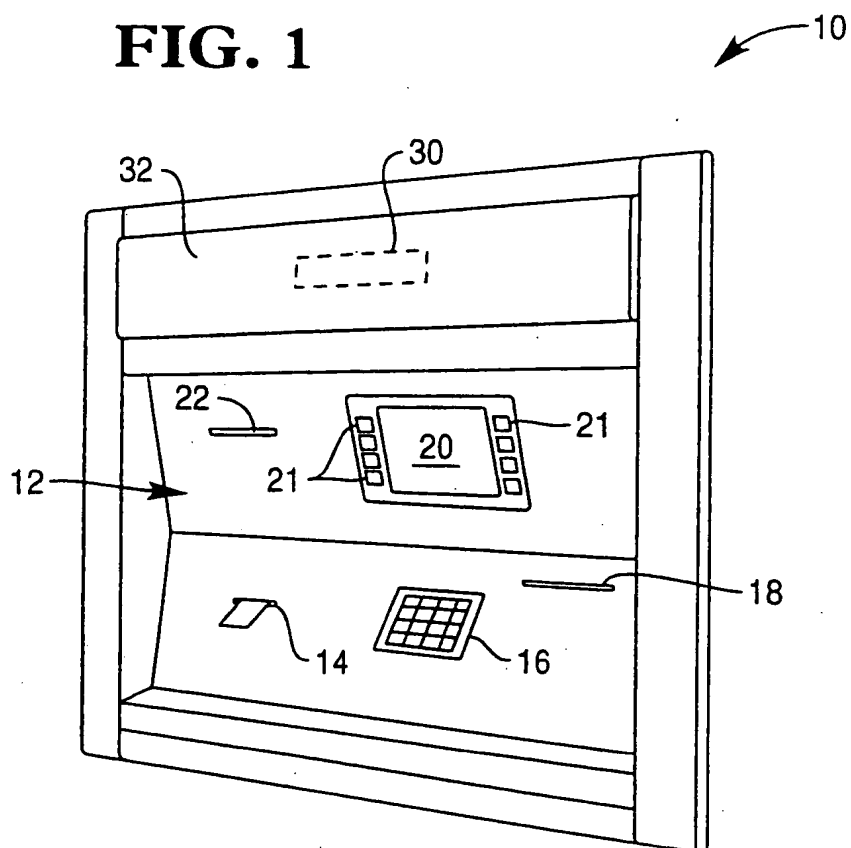
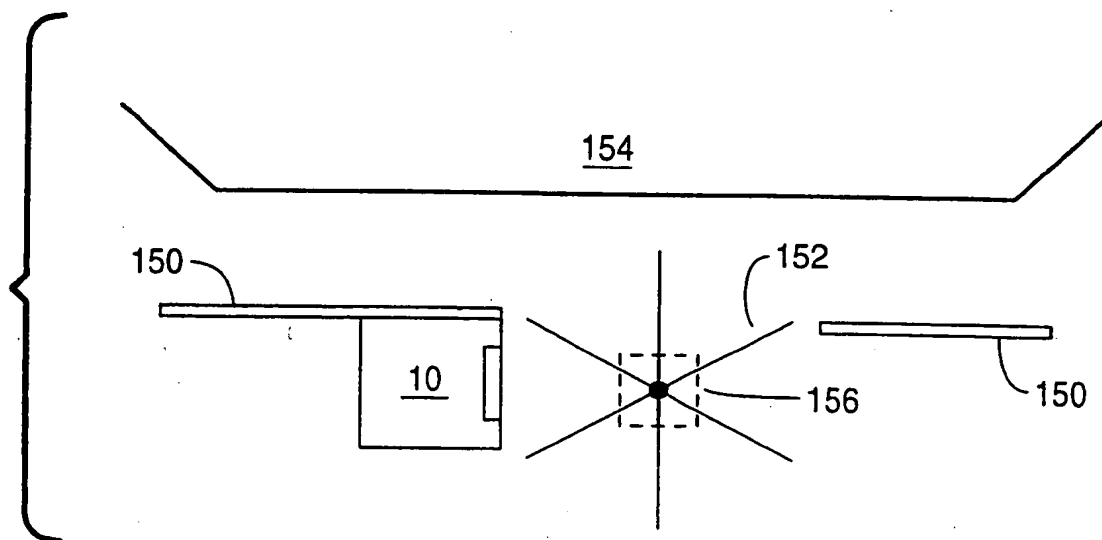
7. A method according to claim 5 or 6, wherein the method comprises the further step of displaying information for assisting the user in ticket selection.

8. A method as claimed in any of claims 5 to 8, wherein the step of determining the identity of a user includes the step of reading card information to determine the claimed identity and verifying the claimed identity using biometrics detection.

9. A facility access system characterised by a self-service terminal (10) and an access control device (152), where the terminal includes means for identifying a user (30,50,52), means for receiving payment from the user (18, or 52 and 68), and means for actuating the access control device (60, 156) to allow the user to enter the facility (154).

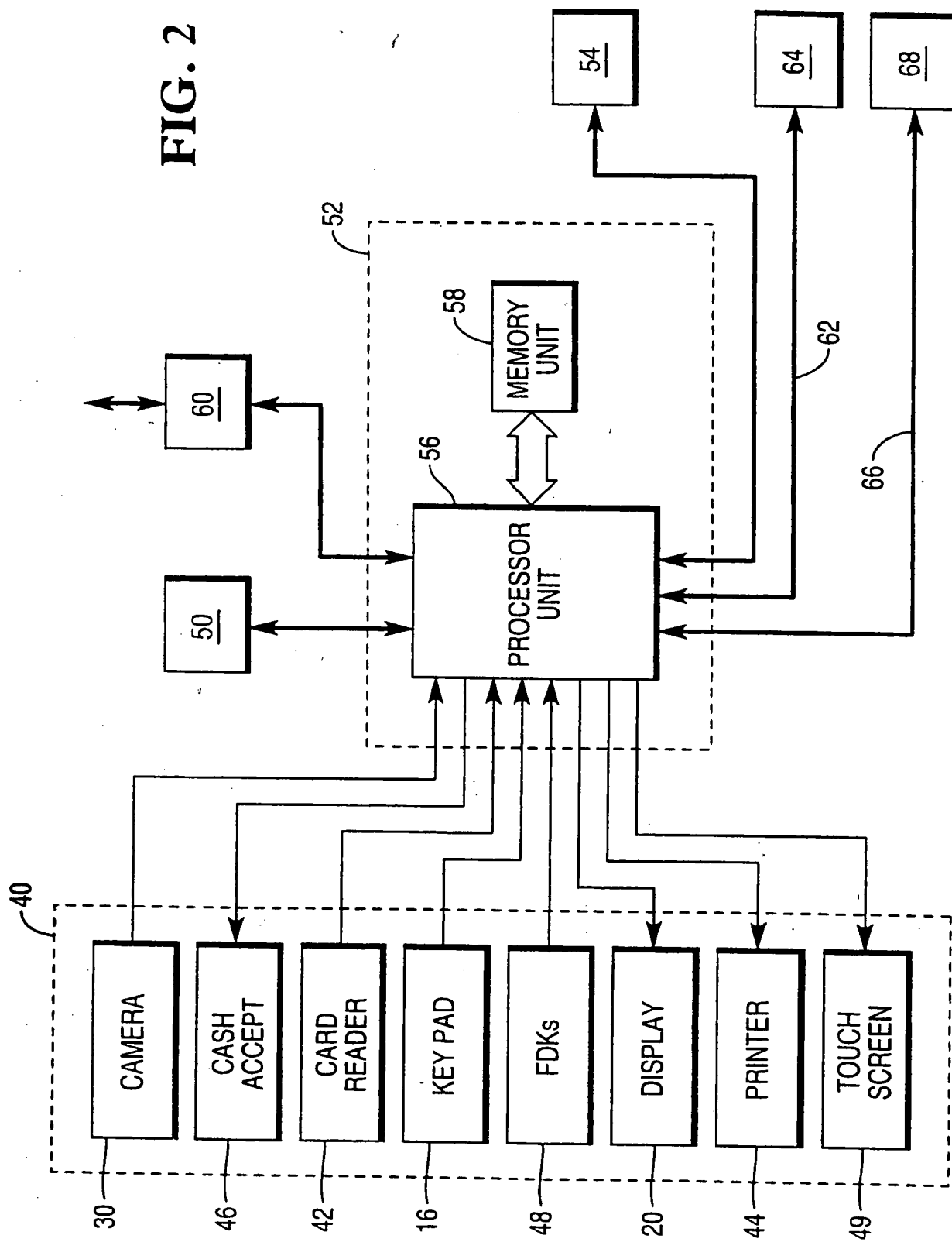
10. A self-service terminal (10) for controlling access to a facility, characterised in that the terminal comprises means for identifying a user (30,50,52); means for determining that a ticket has been assigned to the user (62, 64); and means for actuating an access control device (60, 156) to allow the user to enter the facility (154).

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FIG. 1**FIG. 4**

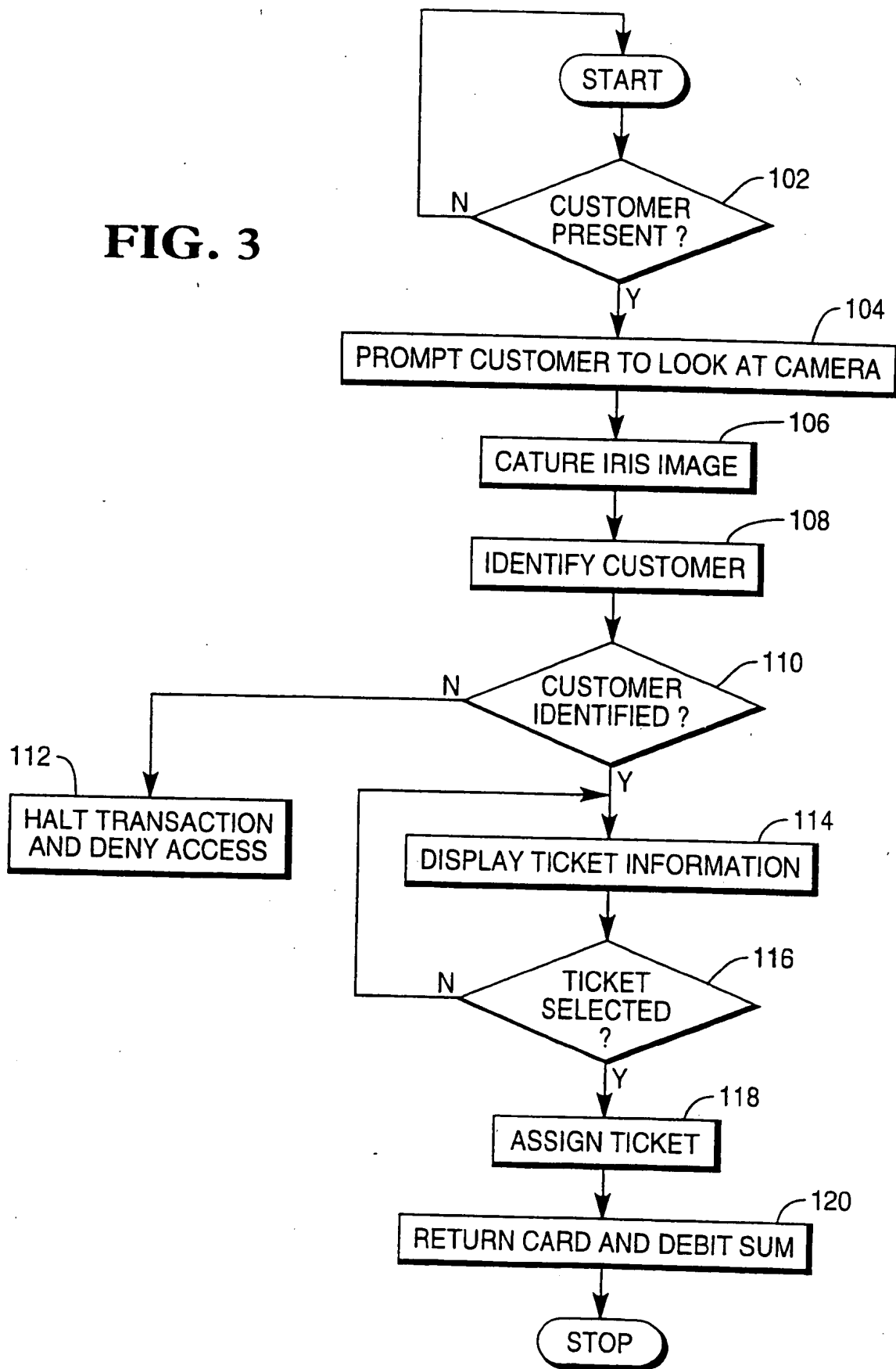
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FIG. 2



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FIG. 3



INTERNATIONAL SEARCH REPORT

Int'l Application No

PCT/GB 99/03673

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07C9/00 G07F7/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G07C G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	DE 43 44 481 A (PRO INNOVATIO FORSCHUNGSZENTRU) 29 June 1995 (1995-06-29)	1-3, 5, 6, 8, 9
A	column 1, line 3 - line 10 column 1, line 33 - line 39; figure 1 abstract	4, 7, 10
A	EP 0 744 715 A (AT & T CORP) 27 November 1996 (1996-11-27) column 2, line 28 - line 54; figures 1-3 abstract	1-3, 5, 6, 8
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03673

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

information on patent family members

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PCT/GB 99/03673

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